

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 11-039858

(43)Date of publication of application : 12.02.1999

(51)Int.Cl. G11C 11/15  
H01L 27/10  
// H01L 43/08

(21)Application number : 09-191380

(71)Applicant : TOSHIBA CORP

(22)Date of filing : 16.07.1997

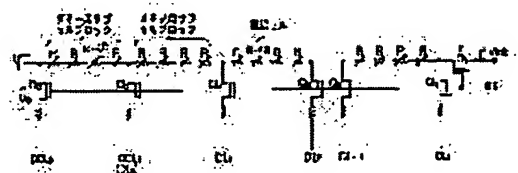
(72)Inventor : TAKASHIMA DAIZABURO

## (54) SEMICONDUCTOR MEMORY DEVICE

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To reduce a voltage drop variation based on a resistance parasitic in transistors and wirings and enable stable and high speed operation even when a signal read from a cell is small by reading data from the nodes at both ends of a sub-cellblock formed by connecting in series the memory cells in the bit line direction.

**SOLUTION:** A magneto-resistive film consisting of a three-layer structure of ferro-magnetic layer, non-magnetic conductive layer and ferro-magnetic layer is connected to a bit line, data '1' is stored when the spins of the magnetic layers of the upper layer and lower layer are in the inverted direction (resistance of bit line is R) and data '0' is stored when these are in the same direction (resistance of bit line is  $R - \Delta R$ ). A cell block is structured by connecting in series a plurality of sub-cellblocks consisting of series connection of four memory cells. In the case of the reading operation, a voltage is applied to Vint, Vs at both ends of the cell block to generate a current in the bit line and the data lines DDL0 to DDLn led from both ends of the selected sub-cellblock are connected to the sense amplifier of high impedance.



## LEGAL STATUS

[Date of request for examination] 28.12.1999

[Date of sending the examiner's decision of rejection] 20.08.2002

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number] 3450657

[Date of registration] 11.07.2003

BEST AVAILABLE COPY

[Number of appeal against examiner's decision of rejection] 2002-18283

[Date of requesting appeal against examiner's decision of rejection] 19.09.2002

[Date of extinction of right]

Copyright (C); 1998,2003 Japan Patent Office